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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,580	11/15/2001	Niel Miller	SKFUSA.004A	3637

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EXAMINER	
LAU, TUNG S	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/991,580	MILLER, NIEL	
	Examiner	Art Unit	
	Tung S Lau	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,22-30,32 and 34-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1* is/are allowed.

6)☒ Claim(s) *2-16,22,30,32 and 34-38* is/are rejected.

7)☒ Claim(s) *23-29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2, 4, 6, 9, 10, 16, 22, 30, 32, 34, 35, 3, 5, 7, 8, 11, 12, 13, 14, 15, 36, 37, 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Choe et al. (U.S. Patent 6,546,814).

Regarding claim 2:

Choe discloses a method, comprising: collecting vibration signal data from at least one vibrating device (abstract), wherein the vibrating device includes at least a rotating inner ring, a rotating outer ring (Col. 2, Lines 5-44), and a plurality of rotating elements; enveloping the vibration signal data; converting the vibration signal to a frequency domain signal (Col. 15, Lines 42-48); determining a noise floor of a frequency domain signal (Col. 15, Lines 42-48), wherein determining excludes a portion of the frequency domain signal that is associated with damage or original manufacture defects in the rotating inner ring, the rotating outer ring, and the plurality of rotating elements (Col. 15, Lines 42-48, abstract); determining the amplitudes of selected portions of the frequency domain signal (Col. 15,

Lines 49-67), wherein the selected portions are associated with the frequency of rotation of the rotating inner ring, the rotating outer ring, and the rotating elements, and wherein determining the amplitudes includes determining the highest amplitudes in the portions of the frequency domain signal that are respectively associated with the defects in the rotating inner ring (Col. 15, Lines 49-67), the rotating outer ring, and the plurality of rotating elements; dividing the determined amplitudes of the frequency domain signal by the determined noise floor (Col. 15, Lines 49-67); comparing the result of the dividing to user-definable alarm levels; and displaying a warning if the result exceeds the user-definable alarm levels (Col. 15-16, Lines 49-50, fig. 12, unit 548, fig. 14, 15).

Regarding claim 4:

Choe discloses a method, comprising: collecting vibration signal data from at least one vibrating device (Col. 15, Lines 42-48); enveloping the vibration signal data; converting the vibration signal data into a frequency domain signal; determining a noise floor of a frequency domain signal (Col. 15, Lines 49-67); determining an amplitude of at least one portion of the frequency domain signal (Col. 15, Lines 49-67); and dividing the determined amplitude of the frequency domain signal by the determined noise floor (Col. 15-16, Lines 49-50).

Regarding claim 6:

Choe discloses a method, comprising: collecting vibration signal data from at least one vibrating device (Col. 15, Lines 42-48), wherein the vibrating device

includes at least a rotating inner ring, a rotating outer ring, and a plurality of rotating elements (Col. 15, Lines 42-48, abstract); enveloping the vibration signal data; converting the vibration signal data into a frequency domain signal (Col. 15-16, Lines 49-50); determining a noise floor of a frequency domain signal; determining an amplitude of selected portions of the frequency domain signal (Col. 15-16, Lines 49-50), wherein the selected portions are associated with the frequency of rotation of the rotating inner ring, the rotating outer ring, and the rotating elements (Col. 15-16, Lines 49-50); and dividing the determined amplitudes of the frequency domain signal by the determined noise floor (Col. 15-16, Lines 49-50).

Regarding claim 9:

Choe discloses a program storage device storing instructions that when executed perform the method comprising: determining a noise floor of a frequency domain signal that is representative of noise generated from a vibrating device (Col. 15, Lines 42-48); determining the amplitude of at least a portion of the frequency domain signal (Col. 15-16, Lines 49-50); and dividing the determined amplitude of the frequency domain signal by the determined noise floor (Col. 15-16, Lines 49-50).

Regarding claim 10:

Choe discloses a system, comprising: means for determining a noise floor of a frequency domain signal that is representative of noise generated from a vibrating device (Col. 15, Lines 42-48); means for determining an amplitude of at

least one portions of the frequency domain signal (Col. 15-16, Lines 49-50); and means for dividing the determined amplitude of the frequency domain signal by the determined noise floor (Col. 15-16, Lines 49-50).

Regarding claim 16:

Choe discloses a system, comprising: a vibrating device; a transducer configured to collect data about the vibrating device (Col. 2, Lines 16-21); and a computer configured to determine a noise floor of a frequency domain signal that is generated from the collected data (fig. 12), wherein the computer is also configured to determine an amplitude of the frequency domain signal at least one portion of the frequency domain signal (Col. 15, Lines 41-67), and wherein the computer is also configured to determine amplitude of the frequency domain signal by the determined noise floor (Col. 16, Lines 1-50).

Regarding claim 22:

Choe discloses a method, comprising: determining a noise floor of a frequency domain signal (Col. 15, Lines 41-67); determining an amplitude of at least one portion of the frequency domain signal (Col. 15, Lines 41-67); and dividing the determined amplitude of the frequency signal by the determined noise floor (Col. 16, Lines 1-50).

Regarding claim 30:

Choe discloses a method of detecting bearing defects, the method comprising: measuring vibration amplitudes at one or more bearing defect frequencies (Col. 15, Lines 41-67); measuring vibration amplitudes of frequencies other than the

bearing defect frequencies to define a noise floor (Col. 15-16, Lines 41-50); dividing the vibration amplitude at bearing defect frequencies by the noise floor to produce a normalized defect frequency amplitude compensated for non-damage related vibration; and comparing the noise compensated vibration measurement to a predefined threshold value (Col. 16, Lines 1-50).

Regarding claim 32:

Choe discloses a system, comprising: a noise floor determination module configured to determine a noise floor of a frequency domain signal (Col. 15-16, Lines 41-50), wherein determining excludes a portion of the frequency domain signal that is associated with damage or original manufacture defects in at least one of the following: a rotating ring and at least one of a plurality of rotating elements (Col. 15-16, Lines 41-50, Col. 2, Lines 5-44)

Regarding claim 34:

Choe discloses a method of detecting bearing defects, the method comprising: measuring vibration amplitudes at one or more bearing defect frequencies (Col. 15-16, Lines 41-50, Col. 2, Lines 5-44); measuring vibration amplitudes of frequencies other than the bearing defect frequencies to define a noise floor (Col. 15-16, Lines 41-50, Col. 2, Lines 5-44); dividing or subtracting the nose floor from the vibration amplitudes at the bearing defect frequencies to produce a noise compensated vibration measurement at the bearing defect frequencies (Col. 15-16, Lines 41-50, Col. 2, Lines 5-44); and comparing the noise compensated vibration measurement to a predefined threshold value (Col. 15-16, Lines 41-50).

Regarding claim 35:

Choe discloses a method of enveloping a vibration signal, the method comprising: receiving a vibration signal that is indicative of vibrations in a vibrating device; and applying a filter to the vibration signal (Col. 7-8, Lines 46-29), wherein the filter has a cut off frequency that is based at leas in part upon the angular velocity of a rotating shaft in the vibrating device (Col. 7-8, Lines 46-29, fig. 1, unit 108).

Regarding claims 3, 5, 7, 8, 11, 12, 13, 14, 15, 36, 37, 38:

Choe discloses the use of cut off frequency based on the shaft of the vibrating device (Col. 7-8, Lines 46-29, fig. 1, unit 108); use of alt least one filter (Col. 7-8, Lines 46-29, fig. 1, unit 108); comparing the result of the dividing to user-definable alarm levels, and displaying a warning if the result if the result exceeds the user-definable alarm levels (fig. 12, unit 548, fig. 14); use of average in the calculation (Col. 14, Lines 6-14); related to defected frequencies (Col. 15-16, Lines 41-50); time domain (Col. 15, Lines 49-67); alarm to a user define level (fig. 12, unit 548, fig. 14); indicating damage of the rotating device (Col. 15, Lines 49-67); use high pass filter (Col. 15, Lines 49-67); use of an absolute value rectifier to the filtered vibration signal (Col. 10-11, Lines 55-5), second band pass filter combination of cut off frequencies of the rotating device (Col. 15-16, Lines 49-17).

Claim Objections

2. Claims 23-29 are objected to because claims 23-29 depend on claim 21 and claim 21 has been cancel by the applicant, correction is required.

Allowable Subject Matter

3. Claim 1 is allowed.

Reasons for Allowance

4. The following is an examiner's statement of reasons for allowance:

Independent claim 1 contains allowable subject matter. None of the prior art of record shows or fairly suggests the claimed invention.

Regarding claim 1:

The primary reason for the allowance of claim 1 is the inclusion of the method steps including the use of filter is a high pass 4th order Bessel filter having a high pass cut off frequency that is based, at least in part, upon the angular velocity of a shaft speed in the vibrating device, and wherein the second filter is a 2^{nd} order band pass filter having a band pass low cut off frequency and a band pass high cut off frequency that are each based, at least in part, upon the angular velocity of the shaft speed. It is these features found in the claim, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S Lau whose telephone number is 703-305-3309. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 703-308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-5841 for regular communications and 703-308-5841 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TC2800 FAX Telephone Numbers: 703-872-9306

TC2800 Customer Service FAX - (703) 872-9317

TL September 9, 2003

John Barlow
Supervisory Patent Examiner
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